

You have 20 minutes to take this quiz. Each problem will be graded for clarity of work as well as correctness, so show all work **clearly and in order**. Circle or otherwise indicate your final answers. Please note that there are problems on both the front and the back of this page.

NO CALCULATORS ON THIS QUIZ.

1. (3 points) [Similar to #8, 7.5]  
Find the exact value of  $\log_2(4^3)$ .

2. (8 points) [Similar to #35, 7.5, #34, 7.4]  
Calculate the following integrals:

(a)  $\int \frac{\log_2(x^3)}{x} dx$

(b)  $\int e^{\ln x} dx$

*Turn over for more...*

**3.** (6 points) [Similar to #18, 7.6]

A year ago there were 4 grams of a radioactive substance. Now there are 3 grams. How much was there 10 years ago?

*Remember that the rate of decay of a radioactive substance is proportional to the amount of substance present. BONUS: Put a star near the place in your work where you use this fact.*

**4.** (3 points) [Similar to #21, 7.4]

Find the derivative of  $\sin(e^{2x})$ .